1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

SHELLFISH

227 *Tridacna* shellfish (*payua*) is obtained from the lagoon corals with the aid of a cutting implement (*hale payua* or *manuia payua*) of *ngangie* wood about 12 inches long. One end is a double-edged, pointed, sharpened blade (*hale*). The other end (*halehale*) is square and has a cutting edge on one side only. Between the two blades is a smooth section of wood used as a handle. Today a piece of iron with wood lashed along the median line is [193] preferred to the wooden implement. Both men and women procure *payua*. Groups of girls or mixed parties of young men and girls go shellfishing together. An outrigger is often taken out from shore to act as a float.

226 By one method the fisherman dives for *payua* in deep water. He cuts the membranes on the two open half-shells with a twist of the *hale* blade of the knife to prevent the shell from closing. Then with the *halehale* blade he makes a circular sweep around both shells and severs the flesh from the shell. He brings the flesh to the surface, leaving the shell below the water. The flesh is placed in a basket tied to the outrigger float. Considerable skill is required to remove *Tridacna* meat with the implement in the time the fisherman can remain submerged.

Another way to procure *payua* is to swim or canoe out to the coral heads of the lagoon and pry (*nukumiki*) the shells from the coral with a digging stick. Today an iron crowbar is preferred for this work. The shells are loaded into the canoe and brought ashore, where the flesh is cut out with a *halehale* or knife. On coral heads in the lagoon close to Motu Ko are huge piles of *Tridacna* shells (*ngaiipayua*) which testify to the value placed on *payua* meat in past times.

226 The flesh of the pearl shell (*uwa ai*) is not eaten. The shells are grasped 321 in the hand and twisted so as to break off the tentacles anchoring the shell to the coral. Pearls were of no value when found inside the shell and were commonly thrown away.

The general name for clams is *pipi*. Various varieties are *pipi yayenga*, *pipi hula*, *pipi tonga*, and *ngau*. They are not eaten but the shells were [413] formerly valued for cutting implements, coconut graters (for which the clam *ngau* was used), taro scrapers, and occasionally for lancets in surgery.

Periwinkles (*nifi*) come over the reef in large quantities at the full of 126 the moon and are especially numerous during the time of the morning rising 262 of the Pleiades. They are collected on the reef by hand by children and adults and form an occasional article of diet, roasted in the shells. The flesh is pulled from the shell with the fingers or a pointed stick. Periwinkles are considered hard to eat and not very satisfying but pleasant enough for a change.

REEF CREATURES

136 Reef creatures found on Pukapuka but not eaten, though sometimes caught on other Polynesian islands for food, are sea porcupines, of which the Pukapukan names four: *matuke* (a blunt-spined sea porcupine); *runa* (a

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mast end, and passes at 6, on near side, diagonally up to shoulder (3) where it gripe poll of ada, passes across far side of heel, and is brought to near side over notch 1, across to toe angle; it makes a turn under toe angle, passes to notch 1, on far side, and then across heel on near side, gripping first diagonal turn (7) of sennit from toe to heel. *b*, continuation of lashing: free end (7) passes across shoulder (3) and across heel to notch 1, where it is brought across to near side and down (8) to near side toe angle; from toe angle it passes to far side of toe and makes a transverse turn around toe, coming back on near side and passing under toe angle (9) to make diagonal turn on far side up to shoulder; brought around shoulder to near side and passes across heel (10) to notch 1, where it passes down far side of heel to make further turns, as described, until four complete turns are made of which, for clearness, only two are shown in *b*. *c*, lashing of point of heel: fourth completed turn brings free end of sennit into position at 11, to make two turns around point of heel; sennit passes diagonally across near side of foot from toe angle to heel, crosses to far side of heel at notch 2, passes across heel and is brought to near side of heel (12) and diagonally down on near side to toe angle; sennit crosses under toe again (13), runs diagonally up to heel on far side and is brought across notch 2, to near side of heel, then across heel and diagonally down on far side to toe angle (14); sennit then ready to make two more turns, repeating diagonal movements between toe angle and heel; four diagonal turns in all, of which only two are shown in *c*. *d*, continuation of lashing: last turn of diagonal lashing brings sennit into position (15) for further turns; sennit passes on near side from toe angle to notch 1, where it lies on top of turns made as in *b*; sennit crosses to far side of heel, then crosses heel to shoulder (3) and goes around to near side of heel and across heel to notch 1 where it passes to far side of heel and down to toe angle (17), forming lower loop (16) of this phase of lashing. *e*, sennit (17) comes around under toe angle and goes diagonally across to heel; turn continued around heel to far side to make upper loop (18), then diagonally down on far side to toe angle; this brings sennit (19) into position to repeat turns as in *d* and *e*; altogether six turns are made, lower loop alternating with upper loop, and free finishing end of sennit brought up on near side of toe angle and buried underneath last two turns at heel angle. *f*, completed lashing: 20, first four turns made around toe, binding lower part of ada to toe of haft; 21, four diagonal turns around point of heel and notch 2; 22, final six turns, alternating lower with upper loop; 23, point where end is buried to complete lashing.

Drill

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The pump drill (*wosa*) was formerly used to drill holes in wood and shell. It was of a common Polynesian design (fig. 22).

To drill a small hole or to drill fragile articles, a light balance was required; for this purpose one half of a dry coconut shell was put on the shaft by pushing the shaft through the soft eye of the shell, the eye part of the shell pointing downward, the open half of the shell pointing upward. To drill a large hole in hard material, a heavy balance was used, the wooden balance on a drill being reenforced if necessary with extra weights of wood.

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The point of the drill was of shell or iron. Informants were at pains to point out that the Pukapukans were aware of iron long before white contact. They procured nails from pieces of boat wreckage which from time immemorial have drifted onto the outer beaches. They burned the wreckage and combed over the ashes for nails hammered into the wood.

To drill is also *wosa*. The worker started a hole by holding the shaft of the drill between the palms of the hands and rotating it. When he had made the slightest depression to hold the point, he worked the drill with the pump handle.

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

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A craftsman took great care of his drill. He rubbed the shaft, crossbar and balance smooth with coral, smoked the wood over the cooking fire and oiled it afterward with coconut oil. The fortunate possessor of a drill with an iron guard point guarded his implement jealously because as a time saver it was of the greatest value to him.

Awl.

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The shell awl (*yuki vaka*), a shell *Terebra cranulata*, was used for making holes in a canoe hull or washstrake where the drill could not be used, or for enlarging holes made by the drill. (See p. 173.) The use of coral mallets for hammering caulking wedges is also described in that context.

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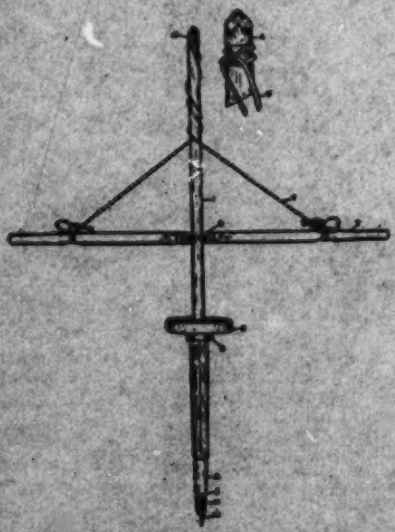

Figure 22.—Pump drill, uwa (C8124): 1, shaft (*laku fa*) of uviuv wood 2 feet 8 inches long, round in cross section and ¾ inch in diameter above balance, square-sided below with sides ⅝ inch wide; 2, distal end of shaft is round, ½ inch in diameter, narrowing to distal point (3) ⅛ inch in diameter; 4, head (*ulu uwa*) of shaft blunt and notched to receive pump cord (*uha uwa*); 5, balance (*potaka*), 4 inches in diameter and ⅝ inch thick, cut from same block of wood as shaft; 6, secondary balance 1⅝ inches square, ½ inch thick; 7, crossbar (*laku uwa*) of wakawaka wood, 1 foot 9 inches long, has wide groove (8) to fit against shaft; each end also grooved to receive ends of pump cord; 9, pump cord of two-ply twisted sennit, fastened with clove hitch to head of shaft and to each end of crossbar; 10, point (*mata*) section of iron forced into end of shaft and lashed tight with 11 transverse turns of three-ply sennit braid; 11, lurid commencement and finishing ends.

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

Scrapers and Rasps

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Scrapers for smoothing wood were formerly selected pieces of coral (*punga*) with rough surfaces (*talatala*). The smoothing (*oloolo*) was done with the wooden object submerged in sea water in order to soften the wood. The first scraping was with the *punga* coral, the finishing scraping with a piece of *kuau* coral which has a surface covered with tiny, sharp "teeth".

The use of wood scrapers to which shark or ray skin is lashed is modern in Pukapuka. Informants stated that although shark skin was used formerly for fashioning pearl-shell hooks, the idea of using it for smoothing wood was introduced from Samoa.

WORKING OF SHELL

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Mother-of-pearl shell is termed *ui*. Other bivalve shells of about the same size and shape as pearl shell are also termed *ui* with an added adjective, as in *ui pakeyau alango*, to distinguish them from true pearl shell. Pearl shell is procured by grasping the shell with the hand and twisting it to break the tentacles. Thick shells were used for composite pearl-shell hooks, thin shell for ornaments and for single-piece shell hooks.

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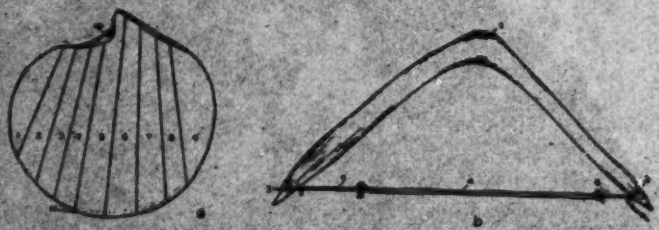

Figure 23.—Division of pearl shell; shell file. *a*, shell regionally divided into nine sections by cutting radially from hinge (10) to lip (11); preferred shanks for composite hooks cut from sections 4 to 7, other shanks from sections 1 to 3, 8 and 9; shanks for small composite hooks, single-piece hooks, and shell points for composite hooks cut from lip half of shell; named sections: 1, *tuua*; 2, *patauu*; 3, *pa hi te uua*; 4, *uyolaloto*; 5, 6, 7, *uyoloto*; 8, *iyumotu*; 9, *ahuua*. *b*, shell file (*kauuna*) of shark skin (C8037): 1, frame, small branch of *waharua* wood with limbs 11 and 9 inches long; 2, 3, ends of limbs pointed and notched; 4, curled shark skin, 9½ inches long, ¾ inch diameter; 5, 6, suspension cords of two-ply twisted sennit, knotted to ends of shark skin, passed transversely around ends of limbs three times and knotted.

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The whole pearl shell (*itu ui*) is regionally divided by the Pukapukans into nine named parts (fig. 23, *a*). Radial sections cut through the hinge of the shell along these regional divisions are used for the shanks of bonito trolling hooks; the lip ends of these radial sections are used for small composite hooks and for bonito points.

I:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

321 The shell is cut along the section lines with the turtle-shell cutting implement (*tahu*) or with a similarly shaped implement made from *punga* coral (*tahu punga*). The edge of the blade is rubbed back and forward along the division line judged with the eye. A scratch is soon made on the nacreous surface of the shell. By further rubbing along this scratched line and by the addition at frequent intervals of water and sand, if the cutting implement is turtle bone, a narrow groove is formed which is finally deepened until the shell is cut through. A cut section of shell is shaped by rubbing and grinding with coral stone and water. Later the shape of a hook is filed out by the use of the shark skin rasp (*kasasa*).

To smooth the outer convex surface of pearl shell, the shell is rubbed on a large piece of *punga* coral placed on the ground in front of the worker. Water is used copiously on the rubbing surface. At intervals the shell is dipped into a bowl of clear water or the surface of the shell is rubbed with the fibrous end of a ripe pandanus key to test the sheen and the stage of polishing reached. When the worker is satisfied that he has procured the desired color, he gives the surface of the shell a final polish by rubbing it vigorously with a dry pandanus leaf.

Lashing or suspension holes are made in shell pieces by the use of the pump drill.

Informants could suggest no ceremonial used in the manufacture of pearl-shell ornaments or composite hooks.

321 The shark-skin rasp is prepared as follows:

412 The skin of a freshly killed fish is submerged in fresh water for about eight days.
281 The skin is pegged out in the sun with wooden pegs until thoroughly dry. It is cut into pieces of suitable length and attached to a forked branch. A piece of skin that is flat longitudinally and transversely is attached to a branch to make the *kasasa ole* used for smoothing and polishing fishhook shanks. For the *kasasa tuanga* which is used to cut out the curves of composite hook points and the bend of a single-piece hook, a piece of shark skin is scraped on the fleshy surface to remove the stiff membranes. This allows the skin to curl transversely and produces a file, round in cross section (fig. 23*b*).

Shark skin is used for all purposes where a coarse abrasive is needed. The tail of the black ray (*tuai kasa*), also used as a file in the manufacture of pearl shell, is preferred by some because it lasts longer than shark skin.

CANOE CONSTRUCTION

501 Two types of canoe are used in Pukapuka today. One, the simple, one-
522 piece, dugout canoe, is used for fishing inside or outside the reef. The
511 other, a plank canoe with washstrakes and bow and stern covers, is used for fishing and for making expeditions to the islets of Ko and Kotawa. Canoe making is a craft still very much alive in Pukapuka and most households possess two or more canoes, one a dugout, the others larger plank canoes.

171 The single-piece dugout (*poti pukasa*) does not seem to be an old style
501 canoe. The only name for it is *poti*, a word probably derived from the
322 English word boat; if this derivation is correct, it is evidence in support of informants' contention that the canoe style is new. Informants suggested that formerly there were not sufficient big trees on the atoll to enable craftsmen to make single-piece canoes. The *poti* in use today is a simple hull balanced by outrigger and two cross booms.

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

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through a hole (*fu ŋa*) in the thick proximal end of the shank, and seized (*fulinnga*) by a lashing thread (*alaala*) passing from the proximal hole of the point to the shank head. The distal end of the shank on the underneath side is cross-hatched (*kotikōti*) to prevent the point-shank lashings from slipping, and filler sticks (*tua niu*), short pieces of coconut leaflet midrib, are pushed underneath the point-shank lashings on either side of the point base to steady the point on the shank.

The following description of the type Pukapukan bonito hook (fig.40) is summarized from an examination of 28 Pukapukan bonito hooks, 11 of these in Bernice P. Bishop Museum, 17 in the field. Terminology employed for parts of the hook is that established by Buck. Lashings are described with the hook horizontal, point to the right, shank head to the left.

FIGURE 40.—Type Pukapukan bonito hook (C8188): point (1) of gold-lipped shell, beveled at functional point, bend, and outer angle; proximal lashing (2) and snood (3) pass through proximal hole (4); oblique lashing turns on back of shank (5); lashing thread (6), after overhand binding knot around proximal lashing, makes two turns through head hole (7) and proximal hole (4); after last turn through proximal hole, thread passes around (3) and its previous turns through head hole; lower threads occasionally left out for short distance and then included again in seizing of snood; toward head, lower threads (6') dropped and seizing continues to head hole; head lashing (8) consists of transverse turns around snood and through head hole, bound with circumferential turns; seizing of snood continues for about 1 inch above head hole (9); distal lashing (10) of point fixes hackle (11) with oblique transverse turns; half hitch binding (12) of distal lashing; thread passes around distal end of point; makes another binding around far side distal lashing, loop knotted (13) and cut to make secondary hackle (14); hackle (11) consists of number of fine threads of *wao*; filler sticks (15) of coconut leaflet midrib pass under both lashings on near and far sides; shank 3¾ inches long; greatest width of head ⅜ inch, height of head ½ inch; width at tail ⅜ inch; thickness of tail ⅝ inch; length of filler sticks 1¾ and 1⅝ inches; length of point base ⅜ inch; thickness of point ⅛ inch.

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The shank is made of strips of shell cut radially through the shell so as to include part of the hinge at one end. The shank length ranges from 3 to 4¾ inches. The length of the hinge-head section in relation to the total length of the shank varies according to the size and thickness of the part of the shell from which the shank is cut. In the hooks examined, length of the hinge-head section of the hooks ranges from ¾ to 1 inches (fig. 41). The width of the tail end of the shanks ranges from ¼ to ½ inch, thickness from ⅛ to ¼ inch.

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans

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The nacreous inner surface of the shell forms the front of the shank, the rough outer surface of the shell, the back of the shank. The back is sometimes longitudinally flat, more often convex with a slight transverse convexity also. It is ground down to remove the dull rough material and to bring out a clear shiny iridescent or golden surface toward the distal end of the tail. Different surfaces are described in the ordinary color terms: *tua melo toto*, a deep gold shank back; *tua kena*, a light iridescent color; *tua pula*, a pronounced rainbow iridescent color.

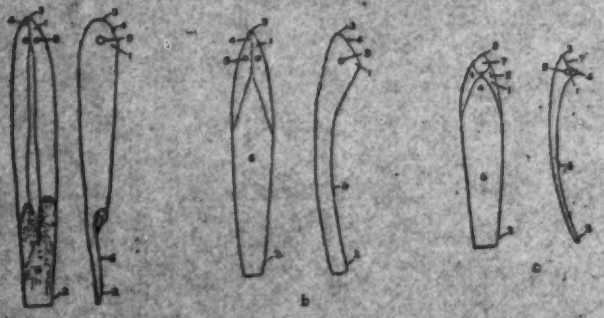

FIGURE 41.—Variation in bonito hook shanks, front and side views. *a*, long shank (C8216) with mesial ridge, slight grinding of head end, short tail section; *b*, type shank (C8187) with well-marked head, tail thicker than usual; *c*, small shank, head has short ridge caused by grinding of proximal end. 1, head; 2, tail; 3, head point; 4, mesial edge; 5, head hole; 6, front nacreous surface; 7, head point ground into concave surface.

A hole is bored transversely from side to side about midway down the thickness of the head. In one shank two such holes were bored, one at the extreme proximal end of the shank, the other nearer the maximum thickness of the head. Only the distal of the two holes carries the head snood lashing and it is evident that the proximal hole was bored by mistake too far back on the head to function properly.

The tails of the shanks are uniformly smooth on front, back, and lateral surfaces. In the opened grave (p. 564), however, Talainga saw a bonito shank that had two paired lateral projections at the tail end of a narrowing shank. He could give no information about the shape of the head of this shank, but the lateral projections are suggestive of similar projections on Melanesian hooks of the Solomon Islands. None could give any information about the shank type. All the hooks examined save one have a cross-hatching scratched on the back of the tail end of the shank.

The point of the bonito hook is shaped from shell cut from the lip edge of the pearl shell. One side shows the inner surface of the shell, the other side the black or gold outer surface which is smoothed down and sometimes polished. Eight points have been made of turtle shell, one of bone, the rest of pearl shell. In all the points the base is prolonged proximally to carry the technical bend of the hook. In 26 points, two holes are drilled through the base of the point to carry the point-shank lashings; two points only have three holes. In none of the points has the proximal hole broken through the upper edge of the point base. Characteristic point shapes are shown in figure 42.

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The snood consists of three-ply twisted sinnet cord about ⅛ inch thick and 20 or more feet long. It is attached directly to the trolling rod without the mediation of a fishline

1: Beaglehole and Beaglehole Σ-5 (1934-5)1938 Pukapukans

227 Shanks of these hooks are of uniform thickness. They do not have the raised head of the bonito shank. Instead, the head consists of a notched projection (*matiwaki*). The shank widens below the head, then narrows and flares slightly to form the tail (*yiku*; fig. 43*c*). The greatest width of the shank in larger hooks is about 5/16 inch, in smaller hooks about 3/16 inch; the width of the tail in larger hooks is about 3/16 inch, in smaller hooks about 1/8 inch; average thickness of all hooks is about 1/16 inch.

[321] Shanks are made of both black-lipped and gold-lipped shell. The inner nacreous surface of the shell forms the front of the shank; the outer rough surface, the back of the shank. This rough surface is smoothed and polished, but the black surface is not ground away as in bonito hooks.

All points are of turtle shell. Characteristic shapes are shown in figure 43*d*. The points range from 1/16 to 3/16 inch in base length and from 1/32 to 1/16 inch in thickness. Two holes only are bored through the base; none of these was broken in the eleven hooks examined.

227 284 The lashing together of the small composite hook corresponds exactly to the method described for the larger bonito hook.

A typical lashing is shown in figure 43*e*. Lashing of point to tail of the shank may be with a single thread for each hole or with a continuous thread. After the proximal hole is lashed with transverse turns which cross obliquely on the back of the shank, the free end of the thread seizes the snood as far as the head of the shank. In these small composite hooks, no thread is run between proximal hole and the head of the shank. The distal lashing is often bound at the side with the finishing thread to make the characteristic secondary hackle of the bonito hook.

Several slight variations may be noted on this fundamental lashing pattern:

Filler sticks are not used in six out of eleven hooks; in these, the filler sticks are coconut midrib and in two the fillers are short fishbones wedged between the distal lashing and the side of the point base. In one hook, the point is lashed with a continuous thread which commences with the proximal hole. A half hitch side binding is made round the far side proximal hole lashing and the free end of the thread is passed underneath and diagonally across the back of the shank, then up to the near side distal hole to commence the lashing of this hole. In a second hook, the proximal hole lashing is completed and the lashing bound on the near side; the free end of the thread is then passed on the near side to the distal hole to make the distal hole lashing. The snood is passed through the proximal hole, but it is seized with a special lashing thread that is knotted round the far side proximal hole lashing, passes from this through the snood loop, and commences the seizing of the snood on the near side.

Secondary hackles are found on four out of eleven hooks. In two hooks the hackle is made according to the bonito hook pattern. In the remaining three hooks, it is made in slightly different fashion. In the first hook, the near side distal hole lashing is bound with the free finishing end of the lashing thread and the thread is cut about 1 inch from the distal hole. At the far side of the distal hole a thread about 2 inches long is passed through, up, back over the distal hole lashing. In one hook, the two free ends of this thread are twisted together and are knotted with the free end of the projecting finishing thread from the near side hole. In the second hook, the two free ends are tied in a double overhand knot effectively binding the far side distal lashing, and these two ends, together with the free finishing end from the near side, are knotted together to form the secondary hackle. In the third hook, both near side proximal and distal hole lashings are bound with a separate thread that is knotted round proximal side lashing, passes to distal lashing, is knotted round this, and passes again beyond the distal end of the point base where it is knotted with the double ends of a second thread that has been knotted round the far side distal hole lashing.

2:Macgregor E-2 (1933) 1935 Pukapukans

and the midrib is pushed through the hole before the needle is withdrawn. As shown by Buck (12) the same technique is used in the Cook Islands.

Most dwelling houses are built on a double platform of coral rubble, the lower platform several feet larger than the floor of the house. The upper platform, which forms the floor of the house, is made on the first platform and extends about 1 foot outside the walls of the house. Each platform is retained by logs or a curbing of coral slabs 8 or 10 inches high.

ADZES

For cutting out canoes and shaping timbers, the Pukapukans, like the dwellers on other Polynesian atolls, made adzes from the *Tridacna* shell—the only local material available.

In the adz shown in figure 13, *a*, the poll is pointed and the side curves to the rounded cutting edges. The striated outer surface of the shell has been left on the convex front and only the bevel ground smooth. The concave inner surface forms the back which has the grinding surface to sharpen the cutting edge.

Another shell adz (fig. 13, *b*) is roughly rectangular in shape. The front is the outer stratified surface of the shell, except at the bevel which is ground on this surface; the back is the concave inner nacreous surface of the shell; the cutting edge is slightly convex. Part of the concavity and thickness of the shell have been removed by grinding down the outer rim until only a slight depression is left in the center. Along the slightly concave cutting edge and the two sides the surface is smooth and flat. The poll is broad and irregular and has a rough broken surface.

An adz found in Pukapuka (but obviously an importation) is made of basalt and is of the type common to western Polynesia (fig. 14). It is a long, thin, flat, quadrangular, tangless adz that tapers from the cutting edge to the poll. The front surface is slightly convex and is narrower than the back. The front, also the bevel of the back, are ground smooth. The remainder of the back and the two sides have rough chipped surfaces. The edge of the blade is straight; the bevel is convex longitudinally. Due to the rough, unground surface of the back, the chin is irregular.

2;Macgregor E-2 (1933) 1935 Pukapukans

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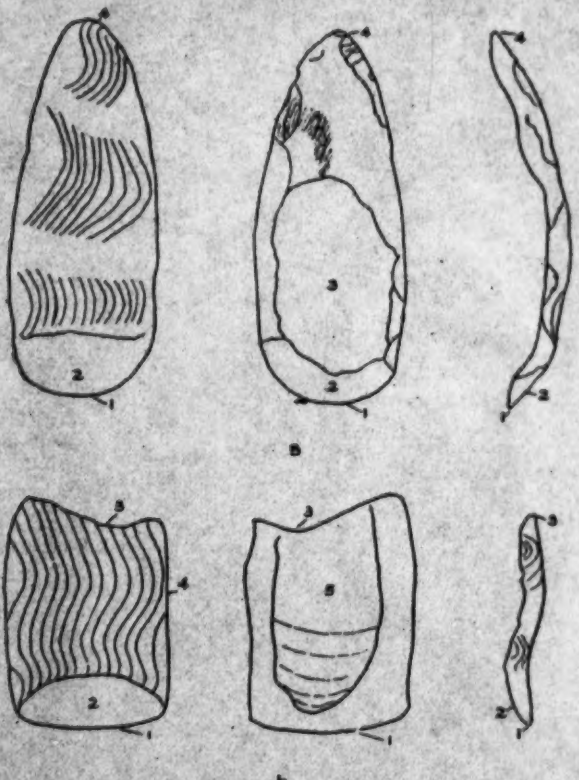

FIGURE 13—Adzes of *Tridacna* shell. *a*, back, front, and side views (adz no. C 6527, Bernice P. Bishop Museum): 1, cutting edge; 2, bevel; 3, concavity of surface; 4, poll; greatest length, 4.75 inches. *b*, back, front and side views (adz in possession of R. D. Frisbie, Tahiti): 1, cutting edge; 2, ground bevel; 3, poll; 4, straight side; 5, central depression from natural concavity of shell; greatest length, 3 inches.

UTENSILS

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A small satchel of lauhala collected at Pukapuka has the following features.

Rectangular-sided and measuring 10 inches long, 8 inches high, and 1.5 inches wide, the satchel is made in simple check pattern. The bottom is flat and has square corners made by turning the strips as they are plaited. Each side is ornamented with strips of hala dyed red with native dyes. These strips are inserted over and included with the plaited elements. The pattern is X-shaped and is 7 inches long. On one side of the basket a solid square of the dyed hala is made between the forks formed by each arm of the X. The reverse side has two squares in each fork. The plaiting is commenced and